Rock Quality Designation

Modified Core Recovery as as
Index of Rock Quality
(after Deere et al, 1967)

Rock Quality Designation, RQD, is based on a modified core recovery procedure which, in turn, is based indirectly on the number of fractures and amount of softening or alteration in the rock mass as observed in the rock cores from a drill hole. Instead of counting the fractures, an indirect measure is obtained by summing up the total length of core recovered but counting only those pieces of core which are 4 inches in length or longer, and which are hard and sound

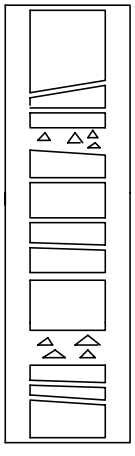
If the core is broken by handling or by the drilling process (i.e., the fracture surfaces are fresh irregular breaks rather than natural joint surfaces), the fresh broken pieces are fitted together and counted as one piece, provided that they form the requisite length of 4 inches. Some judgement is necessary in the case of sedimentary rocks and the foliated metamorphic rocks, and the limestones, sandstone, etc. However, the system has been applied successfully even for shales although it was necessary to log the cores immediately upon removing them from the core barrel before air-slaking and cracking began.

An example is given below from a core run of 60 inches. For this particular case the total core recovery was 50 inches, yielding a core recovery of 83%. On the Modified basis, only 34 inches are counted and the RQD is 57%. It has been found that the RQD is a more sensitive and consistent indicator of general rock quality than is the gross core recovery percentage.

The procedure obviously penalizes the rock where recovery is poor. This is appropriate because poor recovery usually depicts poor quality rock. It is not always true, however, because poor drilling equipment and technique can also cause poor recovery. For this reason double-tube core barrels of at least NX-size (2 1/8 in. diameter) are usually specified and proper supervision of the drilling is imperative.

As simpe as the procedure appears, it has been found that there is a reasonably good relationship between the numerical values of the RQD and the general quality of the rock for engineering purposes. This relationship is below.

Core Recovery		Modified Core Recovery
10"		10"
2"		
2"		
3"		
4"		4"
5"		5"
3"		
4"		4"
6"		6"
4"		
2"		
5"		5"
50"		34"



Core Rec.= 50/60=83%

RQD=34/60=57%

RQD Rock Quality Designation	Description of Rock Quality
0 -25	v. poor
25 -50	poor
50 -75	fair
75 -90	good
90 - 100	excellent